AMENDMENTS TO THE CLAIMS

- At the time of the action: Claims 1-28 and 33-40.
- Currently amended claims: Claims 1, 17, 18, 20, 22, 23, 34, and 38.
- After this action: Claims 1-28 and 33-40.

1. **(Currently Amended)** One or more computer readable storage media having stored thereon a plurality of instructions that implement a distributed computing system in a distributed computing environment based upon a schema, the schema comprising:

at least one definition of a distributed computing system module to be implemented in the distributed computing environment, wherein the at least one definition of the distributed computing system module possesses an inheritance property such that a first definition, when derived from a second definition, inherits a setting constraint and a relationship constraint from the second definition; [[and]]

at least one relationship that identifies potential ~~links~~ interactions between the modules of the distributed computing system such that the schema is used by a development tool to modify the definition and relationship and a deployment tool to implement the module in according to the definition and relationship;

at least one requirement for the distributed computing environment used by the distributed computing system for a first validation to validate the distributed computing environment; and

at least one requirement for the distributed computing system used by the distributed computing environment for a second validation to validate the distributed computing system.

2. **(Previously Presented)** The one or more computer readable storage media of claim 1 wherein the schema is further used by a management tool.

3. **(Previously Presented)** The one or more computer readable storage media of claim 1 wherein the schema allows a user of the development tool to identify desired operational intentions of the at least one distributed system module.

4. **(Previously Presented)** The one or more computer readable storage media of claim 1 wherein the at least one definition includes a resource definition, a component definition and an endpoint definition.

5. **(Previously Presented)** The one or more computer readable storage media of claim 1 wherein the at least one definition includes a resource definition that specifies runtime behavior contained within a distributed computing system module.

6. **(Previously Presented)** The one or more computer readable storage media of claim 1 wherein the at least one definition includes a component definition that describes a self-contained, independently deployable part of the distributed computing system.

7. **(Previously Presented)** The one or more computer readable storage media of claim 1 wherein the at least one definition includes an endpoint definition that describes communication endpoints exposed by the distributed computing system module.

8. (Previously Presented) The one or more computer readable storage media of claim 1 wherein the at least one relationship is the embodiment of at least one potential communication interaction between endpoint definitions of two or more distributed computing system modules, the relationship comprising one or more of:

a containment relationship,

a delegation relationship,

a connections relationship,

a hosting relationship, and

a reference relationship.

9. (Previously Presented) The one or more computer readable storage media of claim 1 wherein the at least one relationship includes a containment relationship that describes the ability of a particular definition to contain members of other definitions.

10. (Previously Presented) The one or more computer readable storage media of claim 1 wherein the at least one relationship includes a delegation relationship that exposes members contained in a particular definition.

11. (Previously Presented) The one or more computer readable storage media of claim 1 wherein the at least one relationship includes a connections relationship that identifies available communication interactions between a plurality of definitions.

12. (Previously Presented) The one or more computer readable storage media of claim 1 wherein the at least one relationship includes a hosting relationship that describes dependencies between a plurality of definitions.

13. (Previously Presented) The one or more computer readable storage media of claim 1 wherein the at least one relationship includes a reference relationship that identifies ordering relationships between a plurality of definitions.

14. (Previously Presented) The one or more computer readable storage media of claim 1 further comprising an abstract portion associated with templates for distributed-applications and a concrete portion associated with particular implementations of distributed-applications .

15. (Previously Presented) The one or more computer readable storage media of claim 1 further comprising a plurality of relationships, wherein the schema provides for the communication of settings across the plurality of relationships.

16. (Previously Presented) The one or more computer readable storage media of claim 1 further comprising a plurality of relationships, wherein the schema provides for the communication of application runtime behavioral information across the plurality of relationships.

17. (Currently Amended) One or more computer readable storage media having stored thereon a plurality of instructions that implement a schema, the schema comprising:

at least one distributed computing system module definition of a portion of an distributed computing system associated with a distributed-computing environment, wherein the at least one distributed computing system module definition possesses an inheritance property such that a first distributed computing system module definition, when derived from a second distributed computing system module definition, inherits a setting constraint and a relationship constraint from the second distributed computing system module definition;

at least one resource definition that specifies module runtime behavior associated with the distributed computing system; and

at least one endpoint definition of communication information associated with the distributed computing system.

18. (Currently Amended) One or more computer readable storage media as recited in claim 17 wherein the schema further includes at least one relationship that identifies ~~links~~ interactions between entities in the distributed-computing system.

19. (Previously Presented) One or more computer readable storage media as recited in claim 17 wherein the schema further includes a containment relationship that describes the ability of a particular definition to contain members of other definitions.

20. (Currently Amended) One or more computer readable storage media as recited in claim 17 wherein the schema further includes a communication relationship that identifies ~~available~~ potential communication interactions between a plurality of definitions.

21. (Previously Presented) One or more computer readable storage media as recited in claim 17 wherein the schema is used by any of: a development tool, a deployment tool, or a management tool.

22. (Currently Amended) One or more computer readable storage media as recited in claim 17 wherein the schema models a target system on which the ~~application~~ distributed computing system will be installed.

23. (Currently Amended) One or more computer readable storage media having stored thereon a plurality of instructions that when executed by a computer implement a design tool, the design tool comprising:

a system definition model to enable defining abstractly the specifications of distributed-computing environments and distributed computing systems; and

a schema to dictate how functional operations modules within the system definition model are to be specified, wherein the schema comprises:

at least one requirement for the distributed-computing environments used by the distributed computing systems to validate the distributed-computing environments; and

at least one requirement for the distributed computing systems used by the distributed-computing environments to validate the distributed computing systems.

24. (Previously Presented) The design tool of claim 23 wherein the design tool is a distributed-application development tool.

25. (Previously Presented) The design tool of claim 23 wherein the design tool is a distributed-application deployment tool.

26. (Previously Presented) The design tool of claim 23 wherein the design tool is a distributed-application management tool.

27. (Previously Presented) The design tool of claim 23 wherein the distributed-applications are scale-invariant.

28. (Previously Presented) A data structure stored on one or more computer-readable storage media that is instantiated in accordance with a schema, the schema being accessible by a plurality of tools, the plurality of tools comprising:

an application development tool, whereby the application development tool defines a system comprised of communicating software and hardware components during a design phase;

an application deployment tool for facilitating deployments to a plurality of host environments and a plurality of scales, whereby the application deployment tool facilitates utilizing a definition of the system developed by the application development tool to perform operations comprising:

deploying the system;

allocating software and hardware; and

configuring the software and hardware; and

an application management tool, the application management tool facilitating new management tools to perform operations comprising:

driving resource allocation;

managing configuration;

upgrading; and

automating processing;

the schema comprising:

at least one system definition of a component of a scale-invariant distributed-application ;

at least one resource definition of an application runtime behavior associated with the component;

at least one endpoint definition of communication information associated with the component;

at least one containment relationship specifying an ability of a particular definition to contain members of other definitions;

at least one delegation relationship that exposes members contained in the particular definition;

at least one communication relationship that specifies available communication interactions between a plurality of definitions;

at least one hosting relationship that specifies dependencies between the plurality of definitions; and

at least one reference relationship that specifies ordering relationships between the plurality of definitions.

29. – 32. (Canceled)

33. (Previously Presented) A method comprising:

creating a data structure in accordance with a schema, the schema defining at least one definition of entities in a distributed-computing system, at least one containment relationship specifying the ability of a particular definition to contain members of other definitions, at least one delegation relationship that exposes members contained in the particular definition, at least one communication relationship that specifies available communication interactions between a plurality of definitions, at least one hosting relationship that specifies dependencies between the plurality of definitions, at least one reference relationship that specifes ordering relationships between the plurality of definitions; and

populating the data structure.

34. (Currently Amended) One or more computer readable storage media having stored thereon a plurality of instructions that, when executed by a processor, cause the processor to perform a method, the method comprising:

loading a definition of entities in a distributed-computing system; ~~and~~

loading a relationship that specifies potential ~~communication~~ links between the entities in the distributed-computing system; and

loading a constraint that specifies a restriction used by one of the entities to constrain the relationship in which the one of the entities participates, or a restriction used by the relationship to constrain one or more of the entities linked by the relationship ~~such that the definition and the relationship are used to develop and deploy the distributed-computing system~~.

35. (Previously Presented) The computer readable storage media of claim 34 wherein the definition and the relationship are further used during management of the distributed-computing system.

36. (Previously Presented) The computer readable storage media of claim 34 wherein the definition includes a resource definition, a system definition and an endpoint definition.

37. (Previously Presented) The computer readable storage media of claim 34 wherein the relationship includes a containment relationship, a delegation relationship, a communication relationship, a hosting relationship and a reference relationship.

38. (Currently Amended) A method comprising:

loading a definition of entities ~~in~~ of a distributed-computing system in a distributed-computing environment; and

loading a relationship that specifies potential ~~communication links~~ interactions between the entities ~~in~~ of the distributed-computing system such that the definition and the relationship are used during development, validation, deployment and management of the distributed-computing system, wherein the validation comprises:

validating the distributed-computing system by the distributed-computing environment according to one or more requirements for the distributed-computing system; and

validating the distributed-computing environment by the distributed-computing system according to one or more requirements for the distributed-computing environment.

39. (Original) The method of claim 38 wherein the definition includes a resource definition, a system definition and an endpoint definition.

40. (Original) The method of claim 38 wherein the relationship includes a containment relationship, a delegation relationship, a communication relationship, a hosting relationship and a reference relationship.